

REMARKS

By this Amendment, claims 17 and 33 are amended. Claims 18-32 and 34-48 remain in the application. Thus, claims 17-48 are active in the application. Reexamination and reconsideration of the application are respectfully requested.

In item 4 on page 2 of the Office Action, claims 17-48 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Maeda et al. (U.S. 5,244,087) in view of Barton (U.S. 5,919,972). Without intending to acquiesce to the Examiner's rejection, claims 17 and 33 have been amended in order to more clearly illustrate the clear distinctions between the present invention and the applied references. Accordingly, the Applicants respectfully traverse this rejection for the following reasons.

Watermarking of digital data has been widely used to prevent the illegal copying of copyrighted audio data streams, but conventional data recording and reproducing apparatuses have proven to be unreliable in satisfactorily protecting copyrighted audio data streams from being illegally reproduced when both compressed and non-compressed audio data streams are input to the conventional data recording and reproducing apparatus. This is because the conventional data recording and reproducing apparatuses, while being able to download compressed audio data streams from the Internet and non-compressed audio data streams from CDs, for example, are unable to insert watermarks into compressed audio data streams. Accordingly, the conventional data recording and reproducing apparatuses are unable to protect compressed audio data streams from being illegally reproduced since such conventional data recording and reproducing apparatuses cannot insert watermarks into compressed audio data streams.

It is therefore an object of the present invention to provide a data recording and reproduction apparatus which can insert a watermark into audio data streams which have either been subjected to a data conversion process or which have not been subjected to a data conversion process, such as compression or scrambling, in order to record and reproduce such audio data streams and still prevent the illegal reproduction thereof.

The present invention achieves this object by providing a data recording and reproduction apparatus into which an audio data stream that has been subjected to a data conversion process for digital audio data and an audio data stream that has not been subjected to a data conversion process for digital audio data are inputted, and which records and reproduces the inputted audio data stream, where the data conversion process causes the audio data stream that has been subjected to the data conversion process to become a stream which is unsuitable for watermark insertion. The data recording and reproduction apparatus of the present invention comprises a stream storage unit for storing the audio data stream, a stream writing unit for writing the audio data stream into the stream storage unit, and a stream reading unit for reading the audio data stream from the stream storage unit, inserting a watermark into the read audio data stream and outputting the read audio data stream.

The stream writing unit of the present invention comprises a stream attribute decision unit (stream attribute decision means) operable to decide whether or not the audio data stream has been subjected to a data conversion process, e.g., compression or scrambling, for digital audio data. The stream writing unit also comprises a writing and attaching unit (stream writing means). Based on the decision by the stream attribute decision unit, the writing and attaching unit (stream writing means) is operable to attach a conversion ID flag to each inputted audio data stream indicating whether the audio data stream has been subjected to the data conversion process, and to write a flag-attached audio data stream into the stream storage unit.

As described above, when an audio data stream has been subjected to a data conversion process, such an audio data stream becomes unsuitable for watermark insertion, and therefore, the copyright of such an audio data stream is unable to be protected when the audio data stream is reproduced. However, the present invention is able to protect the copyrights of audio data streams which have been or which have not been subjected to a data conversion process before being inputted into the apparatus. As described above, this novel feature of the present invention is achieved in part by the stream attribute decision unit being operable to decide whether or not each inputted audio data stream has been subjected to a data conversion process before being inputted to the apparatus of the present invention.

Further, the stream reading unit of the present invention comprises a reading unit (stream reading means) operable to read the flag-attached audio data stream from the storage unit. The data converting unit (data converting means) of the stream reading unit is then operable to subject the read flag-attached audio data stream to an inverse conversion process which is inverse to the data conversion process when the conversion ID flag of the read flag-attached audio data stream indicates that the read flag-attached audio data stream is a stream which has been subjected to the data conversion process, and to output the audio data stream after being subjected to the inverse conversion process. Otherwise, when the conversion ID flag of the read flag-attached audio data stream indicates that the read flag-attached audio data stream is a stream which has not been subjected to the data conversion process, the data converting unit outputs the flag-attached audio data stream without performing the inverse conversion process. The watermarking unit (watermarking means) is then operable to insert a watermark in the flag-attached audio data stream which is outputted by the data converting unit (data converting means).

Accordingly, the present invention is able to insert a watermark in audio data streams that have been subjected to the data conversion process and in audio data streams that have not been subjected to the data conversion process, and therefore, by inserting watermarks in both types of audio data streams, the present invention, unlike the prior art, is able to record and reproduce such audio data streams and still prevent the illegal reproduction thereof.

Claim 17 recites the stream writing unit as comprising the stream attribute decision means for deciding whether or not the audio data stream has been subjected to the data conversion process for digital audio data, and the stream writing means for attaching a conversion ID flag having a value indicating the result of the decision of the stream attribute decision means to the audio data stream, and for writing a flag-attached audio data stream into the stream storage unit. Claim 17 also recites the stream reading unit for reading the audio data stream from the stream storage unit, for inserting a watermark into the read audio data stream, and for outputting the watermark-inserted audio data stream. The stream reading unit of claim 17 is recited as comprising the data converting means for subjecting the read flag-attached audio data stream to an inverse conversion process which is inverse to the data conversion process that the read flag-

attached audio data stream has been subjected to when the conversion ID flag of the read flag-attached audio data stream indicates that the read flag-attached audio data stream is a stream which has been subjected to the data conversion process, and for outputting the read flag-attached audio data stream after being subjected to the inverse conversion process. The data converting means of claim 17 is also recited as outputting the read flag-attached audio data stream without performing the inverse conversion process when the conversion ID flag of the read flag-attached audio data stream indicates that the read flag-attached audio data stream is a stream which has not been subjected to the data conversion process. Further, claim 17 recites that the stream reading unit comprises watermarking means for inserting a watermark in the flag-attached audio data stream which is outputted by the data converting means.

Claim 33 recites the stream writing unit as comprising the stream attribute decision unit operable to decide whether or not the audio data stream has been subjected to the data conversion process for digital audio data, and a writing and attaching unit operable to attach a conversion ID flag having a value indicating the result of the decision of the stream attribute and decision unit to the audio data stream and to write the flag-attached audio data stream into the stream storage unit. Claim 33 also recites the stream reading unit for reading the audio data stream from the stream storage unit, for inserting a watermark into the read audio data stream, and for outputting the watermark-inserted audio data stream. The stream reading unit of claim 33 is recited as comprising the data converting unit operable to subject the read flag-attached audio data stream to an inverse conversion process which is inverse to the data conversion process that the read flag-attached audio data stream has been subjected to when the conversion ID flag of the read flag-attached audio data stream indicates that the read flag-attached audio data stream is a stream which has been subjected to the data conversion process, and to output the read flag-attached audio data stream after being subjected to the inverse conversion process. The data converting unit of claim 33 is also recited as being operable to output the read flag-attached audio data stream without performing the inverse conversion process when the conversion ID flag of the read flag-attached audio data stream indicates that the read flag-attached audio data stream is a stream which has not been subjected to the data conversion process. Further, claim 33 recites

that the stream reading unit comprises the watermarking unit operable to insert a watermark in the flag-attached audio data stream which is outputted by the data converting unit.

Maeda et al. merely discloses a recording and reproduction apparatus for compressing inputted analog audio data in order to continuously record digital audio data on a recording medium for the purpose of reproducing the digital audio data, which the Examiner is considering to correspond to the stream storage unit and the stream writing unit of the present invention. Maeda et al. discloses that the apparatus includes an A/D converter 12 which quantizes the inputted analog audio data to convert the analog audio data into digital audio data (see Column 6, lines 28-61). However, as acknowledged by the Examiner, Maeda et al. does not disclose or suggest inserting a watermark into the digital audio data. Accordingly, Maeda et al. clearly does not disclose or suggest the watermarking means as recited in claim 17 or the watermarking unit as recited in claim 33. Therefore, Maeda et al. clearly does not disclose or suggest the stream reading unit of claims 17 and 33.

To teach this feature, the Examiner applied Barton as disclosing a method for embedding authentication information within digital audio data streams, where the embedded authentication information is an encrypted digital signal (watermark) (see Column 4, lines 21-29 and 51-53, and Column 6, lines 55-65). Barton also discloses that the authentication bit string (watermark) that was embedded in the digital data can be retrieved by using the inverse of the embedding process that was used for embedding the watermark into the digital data (see Column 7, line 65 to Column 8, line 6). Accordingly, Barton clearly discloses that the watermark is embedded in the compressed digital data before the inverse embedding process is performed on the digital data.

However, neither Maeda et al. nor Barton disclose or suggest, either individually or in combination, the stream attribute decision unit (stream attribute decision means) operable to decide whether or not the audio data stream has been subjected to the data conversion process for digital audio data, as recited in claims 17 and 33. Furthermore, neither Maeda et al. nor Barton disclose, suggest or even contemplate the writing and attaching unit (stream writing means) operable to attach a conversion ID flag having a value indicating the result of the decision of the writing and attaching unit (stream writing means) to the audio data stream, and to write a flag-

attached audio data stream into the stream storage unit, as recited in claims 17 and 33.

Accordingly, neither Maeda et al. nor Barton disclose or suggest the stream writing unit of claims 17 and 33.

Moreover, neither Maeda et al. nor Barton disclose, suggest or even contemplate the data converting unit (data converting means) operable to subject the read flag-attached audio data stream to an inverse conversion process which is inverse to the data conversion process that the read flag-attached audio data stream has been subjected to when the conversion ID flag of the read flag-attached audio data stream indicates that the read flag-attached audio data stream is a stream which has been subjected to the data conversion process, and to output the read flag-attached audio data stream after being subjected to the inverse conversion process, as recited in claims 17 and 33. As described above, Barton disclose an inverse conversion process that is performed after the watermark is embedded in the compressed digital data. The present invention, however, determines whether the read flag-attached audio data stream has been subjected to a data conversion process by the conversion ID flag of the read flag-attached audio data stream. Neither Maeda et al. nor Barton, as described above, attach a conversion ID flag having a value indicating whether or not the audio data stream has been subjected to a data conversion process, as recited in claims 17 and 33. Therefore, neither Maeda et al. nor Barton disclose or suggest subjecting the read flag-attached audio data stream to an inverse conversion process which is inverse to the data conversion process that the read flag-attached audio data stream has been subjected to when the conversion ID flag of the read flag-attached audio data stream indicates that the read flag-attached audio data stream is a stream which has been subjected to the data conversion process, as recited in claims 17 and 33.

Moreover, claims 17 and 33 recite that the watermarking unit (watermarking means) inserts a watermark in the flag-attached audio data stream which is outputted by the data converting unit (data converting means). Accordingly, the present invention, as recited in claims 17 and 33, inserts a watermark into the flag-attached audio data stream that has been subjected to a data conversion process after the flag-attached audio data stream has been subjected to an inverse conversion process which is inverse to the data conversion process that the flag-attached

audio data stream was subjected to. However, as described above, Barton clearly discloses that the watermark is embedded in the compressed digital data before the inverse embedding process is performed on the digital data.

Accordingly, neither Maeda et al. nor Barton disclose or suggest the stream reading unit as recited in claims 17 and 33 since neither Maeda et al. nor Barton disclose or suggest the data converting unit (data converting means) and the watermarking unit (watermarking means) of claims 17 and 33.

Therefore, since Maeda et al. and Barton clearly fail to disclose or suggest the stream writing unit and the stream reading unit of claims 17 and 33, Maeda et al. and Barton each fail to disclose each and every limitation of claims 17 and 33. Accordingly, since Maeda et al. and Barton fail to disclose or suggest each and every limitation of claims 17 and 33, no obvious combination of Maeda et al. and Barton would result in the inventions of claims 17 and 33. Therefore, the Applicants respectfully submit that claims 17 and 33 are clearly allowable over Maeda et al. and Barton.

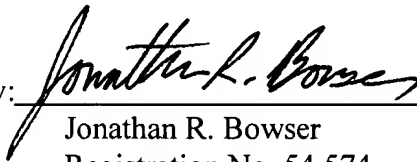
Because of the clear distinctions discussed above, it is submitted that the teachings of Maeda et al. and Barton clearly do not meet each and every limitation of claims 17 and 33. Furthermore, it is submitted that the distinctions are such that a person having ordinary skill in the art at the time the invention was made would not have been motivated to modify Maeda et al. and Barton in such a manner as to result in, or otherwise render obvious, the present invention as recited in claims 17 and 33. Therefore, it is submitted that claims 17 and 33, as well as claims 18-32 and 34-48 which depend therefrom, are clearly allowable over the prior art as applied by the Examiner.

In view of the foregoing amendments and remarks, it is respectfully submitted that the present application is clearly in condition for allowance. An early notice thereof is respectfully solicited.

If, after reviewing this Amendment, the Examiner feels there are any issues remaining which must be resolved before the application can be passed to issue, it is respectfully requested that the Examiner contact the undersigned by telephone in order to resolve such issues.

Respectfully submitted,

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